2A95-35

THE PACIFIC COD FISHERY IN COOK INLET REPORT TO THE ALASKA BOARD OF FISHERIES

by
William R. Bechtol

Regional Information Report[1] No. 2A95-35

Alaska Department of Fish and Game
Commercial Fisheries Management and Development Division
333 Raspberry Road
Anchorage, Alaska 99518

October 1995

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ACKNOWLEDGMENTS

Trish McNeill and Marnee Beverage assisted in the processing of commercial harvest data. James Brady and Steve Fried reviewed this manuscript.

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ABSTRACT

The Cook Inlet management area is defined as all waters enclosed by lines drawn from Cape Douglas to Cape Elizabeth to Point Adam (5 AAC 28.300). Annual harvests of Pacific cod from all Cook Inlet waters have been variable but show an increasing trend, ranging from 397 lb in 1972 to an estimated 4.7 million lb in 1995. The Pacific cod fishery in Cook Inlet has primarily been a small-boat fishery, primarily occurring in the first quarter of the calendar year. Although longline gear produced over 80 percent of all Pacific cod harvests prior to 1991 and has averaged 20 percent of all harvests since 1987, the longline catch of Pacific cod has steadily declined since 1991. The use of pot gear, which has averaged 79 percent of all Cook Inlet Pacific cod harvests since 1987, has continued to increase since 1989 and generated over 97 percent of the 1995 harvest. State waters yielded most of the Cook Inlet Pacific cod harvests from 1987 through 1990 and in 1994. State harvests have been relatively stable since 1991 at about 1.0 million lb annually. In contrast, federal harvests have been highly variable, ranging from 0.6 million to 3.5 million lb since 1991.

KEY WORDS: Pacific cod, Cook Inlet, longline, pot.

INTRODUCTION

The commercial potential of the Pacific cod *Gadus macrocephalus* (herein also referred to as cod) resource in the North Pacific was first realized in the 1850s when the crew of a cargo ship used handlines to catch large quantities of cod (Cobb 1916, 1927 in Rigby 1984). The commercial fishery began in 1864 when a U.S. vessel harvested Pacific cod off Alaska. The developing fishery was primarily composed of distant water sailing ships supporting fleets of dories from which fishermen used handlines. By 1900, the Alaskan shorebased fishery achieved a stature equal to the distant vessel fleet. When this early fishery peaked during 1915-1920, over 17 shore plants were salting or otherwise preserving Pacific cod. Commercial harvests off Alaska began to decline in the 1920s and continued to decline until the early 1950s when the market collapsed and commercial harvesting ceased. Pacific cod harvests remained at relatively low levels until market conditions improved in the mid 1970s. Harvests rapidly increased during the mid-1980s. Through improved stock modeling in recent years, federal managers have attempted to better match commercial harvests with estimated surplus production. As a result, harvest allocations in the early 1990s were reduced about 13-18 percent annually to match changes in natural productivity.

The Alaska Department of Fish and Game (ADF&G) has management responsibility for groundfish resources in the territorial seas (0-3 miles from shore) off the coast of Alaska. Effort and harvest in groundfish fisheries have increased dramatically in recent years as traditional fisheries, such as salmon and crab, have experienced biological or economic declines (Bechtol 1992; Vincent-Lang and Bechtol 1992; Bechtol and Morrison *in press*). Due to a lack of fully developed groundfish research and management programs for territorial waters of the Central Region, ADF&G often applies inseason management actions announced by the National Marine Fisheries Service (NMFS) for the adjacent federal waters of the Exclusive Economic Zone (EEZ) to provide for resource conservation in the nearshore waters. Specifically, federal openings and closure are simultaneously implemented by ADF&G in the nearshore state waters. However, without information on stock structure, it is not possible to determine whether federal management strategies are appropriate for nearshore species inhabiting the territorial seas.

To ensure long-term, sustainable yield, stock management needs to be tailored to both the resource and the fisheries. The industry has requested that ADF&G, the Alaska Board of Fisheries, and the public develop comprehensive management plans that would provide long-term, sustainable yield from groundfish resources within the Cook Inlet area. Of particular interest is the Pacific cod resource which generates the largest component of the Cook Inlet groundfish harvest (Bechtol 1995). This report provides:

(1) a description of state and federal waters within the Cook Inlet geographic area;
(2) a generalized Pacific cod life history;

(3) a review of Pacific cod commercial harvests ; and
(4) recommendations for future management.

METHODS

Geographic Area

For this report, Cook Inlet includes all waters enclosed by lines drawn from Cape Douglas to Cape Elizabeth to Point Adam (5 AAC 28.300) (Figure 1). State waters, or the territorial sea, in Cook Inlet extend from 0 to 3 miles offshore, except for bays encompassed by a 3 mile line extending from a baseline drawn between headlands. Under the latter exception, Cook Inlet state waters include Kachemak Bay; waters north of a line running approximately from Ninilchik to Kalugin Island; and several bays along the west side of Cook Inlet, including most of Kamishak Bay. The remaining central portion of Cook Inlet is defined as waters of federal jurisdiction. Cook Inlet is typically less than 75 fathoms deep with a substrate of silt or mud.

Harvest Data

Commercial Harvests

Commercial harvest summaries for years prior to 1987 were obtained from Blackburn et al. (1983) and from unpublished data (Rance Morrison, Alaska Department of Fish and Game, Homer, Alaska, personal communication). There have been substantial changes in the delineation of the Cook Inlet management area for groundfish. Prior to 1987, many statistical reporting areas encompassed both state and federal waters and the Cook Inlet Management area included waters extending to Cape Fairfield. Because annual harvests of Pacific cod prior to 1987 were relatively small compared to current harvest levels and since most vessels probably fished close to Cook Inlet ports, harvests prior to 1987 were assumed to have come from the area currently defined as Cook Inlet. In addition, no attempts were made to apportion harvests prior to 1987 between state and federal waters.

Commercial harvest data was obtained from commercial fish ticket landing records for the years 1987-1994 and from preliminary data for January through August 1995 (ADF&G 1987). In all cases, harvests are reported as round weight in pounds (lb). In some instances, harvest data has been pooled to protect confidentiality in compliance with Alaska statute 16.025.815. Harvest data were further summarized by state and federal waters

Sport Harvests

Sport harvests of Pacific cod from Cook Inlet in 1994 were estimated in two ways. The first was based on the statewide postal survey. Since this survey includes Pacific cod under "other species" (Mills *in preparation*), assuming that all of this harvest consisted of Pacific cod provides a conservative estimate. The second estimate was obtained using port sampling data to determine the average ratio of cod to the number of halibut harvested within both the central and the lower Cook Inlet subareas. This ratio was then applied to the estimated halibut sport harvests in all Cook Inlet waters (Scott Meyer, Alaska Department of Fish and Game, Homer, Alaska, personal communication).

COMMERCIAL MANAGEMENT STRATEGIES

Federal Waters

The National Marine Fisheries Service (NMFS) manages federal waters of Cook Inlet as a component of the Central Gulf of Alaska Regulatory Area of the Exclusive Economic Zone (EEZ). Population estimates for Pacific cod in the Gulf of Alaska are currently derived from a length-based stock synthesis model (Methot 1990; Thompson and Zenger 1994). This model uses length composition data from commercial trawl, longline, and pot fisheries, as well as data from the NMFS triennial trawl survey. Federal harvest goals in recent years has been set at $F_{35\%}$, the fishing mortality rate at which the spawner per recruit is reduced to 35 percent of the unfished population. In recent years, the total allowable catch allocation (TAC) has been divided among federal management areas to reflect the biomass distribution estimated by the 1993 triennial trawl survey. NMFS then manages a variety of federal water fisheries to achieve the management area TAC. As the TAC is approached, federal managers implement bycatch-only restrictions for Pacific cod. This curtails the directed fishery harvest of Pacific cod and reserves a portion of the TAC for use as bycatch in non-target fisheries.

In 1995, the Central Regulatory Area was allocated 66 percent (45,650 metric tons) of the Gulf of Alaska TAC for Pacific cod. The Central Regulatory Area was further apportioned to the onshore fleet (90 percent) and to the offshore fleet (10 percent). No gear specific allocations are made, but gear-specific fishing closures resulting from the incidental catch of halibut may preclude the use of some gears, notably trawl or longline, during a portion the Pacific cod season. Pacific cod seasons in federal waters of Cook Inlet coincide with seasons in the adjacent federal waters.

State Waters

ADF&G and NMFS cooperatively manage groundfish resources off the coast of Alaska. However, with few well developed research and management programs, ADF&G often depends on seasons established for the adjacent waters of the Exclusive Economic Zone (EEZ) to ensure conservation of groundfish resources in state waters. When the Pacific cod harvest approached the federal TAC for the Central Regulatory Area, NMFS closed the directed fishery. Concurrently, Pacific cod in state waters of Cook Inlet area was also closed to ensure conservation and compatible management of the Pacific cod resource, and to facilitate enforcement. When federal waters closed in recent years, ADF&G examined the Pacific cod harvest from Cook Inlet with respect to historical harvest levels. Because Cook Inlet harvests have been at or above the average annual harvest level, Cook Inlet state waters were also closed to Pacific cod fishing. Prior to 1995, bycatch provisions did not exist in state regulations for the Cook Inlet Pacific cod fishery, so cod retention was prohibited in Cook Inlet state waters following a directed fishery closure. In 1995, the Alaska Board of Fisheries adopted a regulation for bycatch allowances by longline gear.

Gear Closure Areas

To protect depressed crab resources in Cook Inlet, the Alaska Board of Fisheries, through regulatory action, and ADF&G, through inseason emergency orders, have implemented gear restrictions in specific Cook Inlet areas. The most important actions have been: (1) regulatory closures of Kachemak and Kamishak Bays to non-pelagic trawl gear; (2) inseason closures of waters north of Cook Inlet to non-pelagic trawl gear; and (3) inseason closures of Kamishak Bay and the primary crab habitat in Kachemak Bay to groundfish pot gear. The Kachemak Bay pot closure area was modified slightly in 1995 in response to industry requests to increase the potential groundfish pot fishing area while maintaining acceptable crab bycatch. Actions 2 and 3 above have been submitted as proposals to the Alaska Board of Fisheries for adoption into regulation.

BIOLOGY AND DISTRIBUTION

Pacific cod are found from Santa Monica Bay, California, around the rim of the North Pacific and the Bering Sea to the northern parts of the Yellow Sea (Hart 1973). Although Pacific cod vary in growth and seasonal distribution throughout their geographic range, some trends are evident between areas (Hart 1973; Blackburn 1982; Bakkala 1984; Dunn and Matarese 1985). Pacific cod are considered to be benthic, occurring at depths from the intertidal to 150 fathoms (275 m) and infrequently as deep as 300 fathoms (550 m). Adult Pacific cod move to deeper water in the fall and shallow water in the spring. They congregate during the spawning season and typically are more dispersed during the remainder of the year. Spawning occurs in the winter, usually during the first third of the calendar year. Each female releases demersal eggs that are approximately 1 mm in diameter. Fecundity varies with length; each female releases 200,000-3.0 million eggs Fertilized eggs typically hatch in 10-15 days, although timing varies with temperature. Newly hatched larvae are about 3.5-4.5 mm long and tend to remain near the bottom. At about 25 mm (1 inch) cod develop a full complement of fin rays and are considered to be juveniles. Juvenile cod are thought to occupy nearshore, coastal waters during the first year of their life and grow to 8-13 cm (3-5 inches) in length by the fall. Age 1 cod are about 25 cm (10 inches) long and are found in slightly deeper water. Age 2 (about 40 cm; 16 inches), age 3 (50 cm; 20 inches), and older fish tend to winter in progressively deeper waters. Age 2 and 3 cod predominate in NMFS trawl survey catches whereas age 2, 3, and 4 fish compose the bulk of commercial harvests. Abundance declines rapidly for cohorts older than age 4 and fish older than age 8 are relatively uncommon. Mortality varies by age and between years but is likely in the range of 30-40 percent per year. Females first mature at about 40 cm in length (16 inches) at age 2; 50 percent of females are mature at about 55 cm (22 inches). About half of all males may be mature at age 2. Pacific cod feed on a wide variety of fish and invertebrates. Specific diets vary geographically and seasonally with prey abundance and Pacific cod size. Common diet items include pollock, shrimp, and crab, particularly Tanner crab *Chionoecetes bairdi*. For larger Pacific cod, fish such as pollock *Theragra chalcogramma*, herring *Clupea harengus*, sculpins Cottidae, and capelin *Mallotus villosus*, may comprise an increasingly important dietary component.

PACIFIC COD HARVESTS

Sport Harvests

Two estimates of sport harvests of cod were available for 1994. The first, based on the statewide Sport Fish postal survey, estimated that 3,783 "other species" were harvested (Mills *in preparation*). It is likely that the largest component of this category was Pacific cod. The second, based on the ratio of Pacific cod to Pacific halibut estimated a retention of 4,356 Pacific cod in 1994 (Scott Meyer, Alaska Department of Fish and Game, Homer, Alaska, personal communication). Assuming an average weight between 5 and 6 lb per cod, the total sport harvest probably ranged from 21,780 to 26,136 lb. Because this estimated removal is small compared to the total Cook Inlet commercial harvest, further analyses were not conducted and recreational harvest estimates were not incorporated into the commercial catch composition data.

Commercial Harvests

Annual Harvests

The reported commercial harvest of Pacific cod in Cook Inlet ranged from less than 400 lb in 1972 to a record 4.7 million lb in 1995 (Table 1). Several distinct harvest patterns were evident in these catches (Figure 2). Prior to 1986, reported harvests were less than 50,000 lb and the 15 year average was 16,136 lb. Harvests increased rapidly in 1985 and 1986 and between 1986 and 1990 averaged 326,290 lb annually. Pacific cod harvests from Cook Inlet exceeded 2.0 million lb for the first time in 1991, averaging 1.9 million lb during 1991 to 1994. Another substantial increase occurred in 1995 when the harvest exceeded 4.7 million lb.

It is likely that a significant removal of Pacific cod occurred, but was not reported, during Cook Inlet crab fisheries. A limited study in 1982 estimated over 300,000 lb of Pacific cod were harvested from crab pots and used as hanging bait in Cook Inlet crab fisheries (R. Morrison, Alaska Department of Fish and Game, Division of Commercial Fisheries, Homer, Alaska.). By comparison, lest than 26,000 lb were reported as commercial harvest in 1982 (Table 1).

In 1987, Pacific cod were delivered in all months of the year, but with most harvests occurring through the winter (Figure 3). As the fishery developed and intensified, the season has been reduced to control harvests. Cod harvests have continued to be an important part of the Cook Inlet economy, particularly in February and March. Harvests during the remainder of the year mainly reflect bycatch during directed halibut fisheries.

Harvest by Jurisdictional Area

State waters contributed the largest portion of the Cook Inlet cod harvests from 1987 through 1990 and again in 1994 (Table 2; Figure 4). State water harvests have been relatively stable since 1991, ranging from 799,315 to 1.2 million lb. In contrast., harvests since 1991 from Cook Inlet federal waters have been more variable, ranging from 626,806 to 3.5 million lb. State harvests may be constrained by the area available to groundfish fishing and federal fishery limitations on transboundary migrations. In addition; while much of the Pacific cod fleet has shifted to pot gear (see below), a substantial portion of the state waters in Cook Inlet have been closed to pot gear due to concerns over incidental bycatch and mortality of crabs.

Harvests by Gear Type

Harvest increases in the 1990s were accompanied by the increasing use of pot gear (Table 3; Figure 5). Because the use of pot gear in the Pacific cod fishery is relatively new, it is a reasonable assumption that most of the reported Pacific cod harvest from Cook Inlet prior to the mid-1980s was taken by longline gear and to a limited extent by trawl gear. In 1987, longline gear produced 91 percent of the Cook Inlet harvest, while pot gear produced less than 10 percent of the reported Cook Inlet harvest prior to the 1990s. However, pots accounted for 58 percent of the 1991 harvest and then rapidly increased in importance, producing over 97 percent of the 1995 harvest. Although the percentage of the catch landed by longline gear has steadily declined, the poundage harvested by longline gear had been relatively stable since 1990.

This change from the use of longlines in the late 1980s to pots in the 1990s has occurred in both state and federal waters of Cook Inlet. In state waters longline gear has contributed 32 percent and pot gear 66 percent of total cod landings since 1987. In federal waters; longline gear has contributed 10 percent and pot gear 90 percent of total landings since 1987. The shift to pot gear in state waters is particularly interesting because a substantial portion of Kachemak Bay, the state waters closest to the ports of Homer and Seldovia, has been closed to pot gear in an effort to protect depressed and rebuilding crab stocks.

Industry Conference on State Groundfish Fisheries

An industry conference sponsored by the Peninsula Marketing Association and the Aleutians East Borough was convened during April 13-14, 1995 to evaluate management of groundfish fisheries in state waters of the Gulf of Alaska (Anon 1995). Although a variety of species were discussed, Pacific cod appeared to be the primary species of interest. A general concern was voiced over the preemption of local, shore-based vessels by the larger, mobile offshore vessels. It was suggested that management programs for nearshore fisheries be developed to meet the needs of the shorebased fleets. Specific recommendations from the conference included:

1) area registration - southeast Alaska would be a superexclusive area;
2) vessel size limits - not more than 58 feet, except for grandfathered vessels;
3) gear restrictions - promote jig gear, prohibit non-pelagic trawl gear, and area-by-area restrictions on longline, pots (≤60 pots), and jigging machines (≤6 machines);
4) quotas - independent of federal allocations and set for species, area, and gear type; and
5) trip limits - as appropriate by species.

SUMMARY AND MANAGEMENT OPTIONS

Currently, ADF&G lacks specific strategies for management of Pacific cod in Cook Inlet. In the absence of fully developed research and management programs, seasons in state waters of Cook Inlet have been managed to coincide with the federal seasons in waters of the adjacent EEZ. Consideration of independent state actions has been tempered by annual harvest levels that have been at or in excess of historical harvest levels. In addition, state seasons that contrast with seasons in the adjacent federal waters of Cook Inlet may be difficult to enforce. However, federal management strategies, based on a Total Allowable Catch (TAC) for the Central Gulf of Alaska, may be inappropriate for resource management in Cook Inlet state waters.

Groundfish harvests can differ substantially over time in response to changes in resource abundance, allowable gear types, tidal fluctuations, and also fishing fleet dynamics and alternative fisheries opportunities. ADF&G recognizes the current management strategy of Pacific cod in Cook Inlet does not specifically address concerns of local, shore-based fleets. However, any state management program that significantly deviates from the management program for federal Cook Inlet waters may be difficult to enforce. In the absence of developed state management programs, management and enforcement may be better realized if seasons coincide in the 0 to 3 mile and the adjacent federal waters. ADF&G has the following

recommendations for the development of specific groundfish management plans for the Cook Inlet area.

Seasons:

Although resident populations of many species likely exist in Cook Inlet state waters, most species exhibit some seasonal migration and typically congregate during spawning. Fishing on spawning congregations may generate a lower bycatch of non-target species, and may also yield a relatively high product value because of markets for gonad products. However, the long-term biological impact of fishing on a spawning population may be unknown. Pacific cod flesh quality is high outside of the spawning season, as evidenced by the development of winter cod fisheries for fillet markets in the mid 1980s (Table 1; Figure 3). Pacific cod seasons could potentially be extended through a greater portion of the year by dividing an annual catch into spawning and non-spawning season components such as quarters or trimesters.

Harvest Quotas

Data to establish a specific harvest quota for Pacific cod is generally lacking, although some limited data is available from ADF&G summer bottom trawl surveys of Kachemak and Kamishak Bays. Although these surveys have focused on crab assessment, survey data could be modified to develop a minimum estimate of cod biomass. However, the migration and population structure of cod at other times of the year is currently unknown. In the absence of better stock structure information, the historical average harvest may also provide an initial harvest guideline.

Vessel Size

Most of the Cook Inlet fleet, with limited exceptions, are less than 60 feet in length. Most of the Cook Inlet groundfish fleet has been shore-based, and most deliver to the ports of Homer (Bechtol 1995). Landings to Ninilchik, Nikiski, and Kenai have increased in recent years and Seldovia has historically been a significant port of landing.

Gear Restrictions

Several area-specific gear restrictions already exist or are being proposed. Notably, non-pelagic trawl gear has been prohibited in Kamishak Bay and most of Kachemak Bay. However, a

substantial portion of the Kamishak closure is in federal waters and the adopted state regulations do not entirely protect the rebuilding crab resources of this area. Kamishak Bay and a large portion of Kachemak Bay have also been closed to pot gear, by inseason emergency order, to protect crab resources. These Cook Inlet pot closures have been proposed as regulatory closures to the Board of Fisheries. A closure of waters north of Anchor Point to non-pelagic trawl gear has also been proposed for crab protection.

Jurisdictional Issues

Cook Inlet is currently divided into state and federal waters. Management of federal waters is accomplished according to seasons established by NMFS in the adjacent federal waters of the Central Gulf of Alaska Regulatory Area. Seasons in state waters are generally set to coincide with seasons in the adjacent federal waters. However, a major problem in managing Cook Inlet groundfish in this way is the inability of state managers to protect depressed crab resources from groundfish operations, particularly trawl gear. Under the existing federal program, trawl vessels only need to comply with federal trawl regulations if targeting flatfish in federal waters of Cook Inlet. Past actions of the Board of Fisheries to protect crab resources in some Cook Inlet areas, specifically outer Kamishak Bay, have no jurisdictional authority. Groundfish management which best meets the needs of the Cook Inlet fishing communities, as well as to protect Cook Inlet crab resources, would be greatly facilitated by jurisdictional management authority which is consistent throughout the Cook Inlet area and oriented toward Cook Inlet resources and fleets. Through an ability to implement localized management actions, ADF&G may be best suited to such responsibility. A proposal has been submitted to the Board of Fisheries requesting the state pursue the transfer of groundfish management authority for all Cook Inlet waters from the federal government to the state of Alaska. Such a step would involve submitting a proposal, possibly from the state or the Board, requesting an amendment to the Gulf of Alaska Fishery Management Plan. However, the extent to which a comprehensive management plan for Cook Inlet can be developed and implemented would be contingent upon adequate funding for research and management.

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Table 1. Annual commercial harvests and 5-year running average of harvests of Pacific cod from Cook Inlet during 1970 to 1995.

Year	Round Weight (lb) Annual	5-Year Average	Year	Round Weight (lb) Annual	5-Year Average
1970	8,742	16,942	1986	169,893	323,623
1971	58,630	29,126	1987	884,969	319,373
1972	397	28,737	1988	214,903	365,389
1973	48,733	15,443	1989	7,726	648,775
1974	7,188	17,521	1990	353,958	1,014,441
1975	5,454	5,454	1991	2,018,514	1,561,316
1976	8,710	10,807	1992	1,677,565	1,929,655
1977	465	9,658	1993	2,195,225	2,587,549
1978	28,597	7,721	1994	1,827,314	2,890,876
1979	858	9,720	1995[a]	4,650,090	3,238,702
1980	965	8,949			
1981	8,460	14,067			
1982	25,513	16,178			
1983	21,328	20,245			
1984	9,412	56,340			
1985	24,725	272,250			

a Harvest data processed through September 1995.

Table 2. Annual commercial harvests of Pacific cod from state and federal waters of Cook Inlet during 1987 to 1995.

	State Waters			Federal Waters			Combined Areas		
Year	Vessels	Landings	Weight (lb)	Vessels	Landings	Weight (lb)	Vessels	Landings	Weight (lb)
1987	126	565	716,841	47	90	168,128	157	655	884,969
1988	36	136	211,229	8	8	3,674	43	144	214,903
1989	3	3	7,144	1	1	582	4	4	7,726
1990	34	101	219,894	30	42	134,064	59	143	353,958
1991	78	343	940,210	29	74	1,078,304	86	417	2,018,514
1992	51	271	799,315	27	77	878,250	62	348	1,677,565
1993	28	177	908,053	22	65	1,287,172	35	242	2,195,225
1994	28	244	1,200,508	10	34	626,806		278	1,827,314
1995[a]	34	331	1,182,891	28	119	3,467,199		450	4,650,090

a Preliminary harvest data processed through September 1995.

Table 3. Commercial harvest of Pacific cod by gear type from state and federal waters of Cook Inlet during 1987 to 1995.

	Round Weight (lb)			
Year	Longline	Pot	Other	Total
		State Waters		
1987	644,076	20,151	52,614	716,841
1988	180,987	17,111	13,131	211,229
1989	7,144	0	0	7,144
1990	219,894	0	0	219,894
1991	474,909	462,972	2,329	940,210
1992	142,613	644,044	12,658	799,315
1993	115,952	792,101	0	908,053
1994	103,565	1,096,943	0	1,200,508
1995a	115,462	1,067,429	0	1,182,891
		Federal Waters		
1987	164,807	0	3,321	168,128
1988	2,720	0	954	3,674
1989	582	0	0	582
1990	74,069	32,444	27,551	134,064
1991	364,267	711,471	2,566	1,078,304
1992	75,492	802,758	0	878,250
1993	27,873	1,259,299	0	1,287,172
1994	24,702	602,104	0	626,806
1995[a]	11,395	3,455,804	0	3,467,199
		Combined Areas		
1987	808,883	20,151	55,935	884,969
1988	183,707	17,111	14,085	214,903
1989	7,726	0	0	7,726
1990	293,963	32,444	27,551	353,958
1991	839,176	1,174,443	4,895	2,018,514
1992	218,105	1,446,802	12,658	1,677,565
1993	143,825	2,051,400	0	2,195,225
1994	128,267	1,699,047	0	1,827,314
1995[a]	126,857	4,523,233	0	4,650,090

[a] Harvest data processed through September 1995.

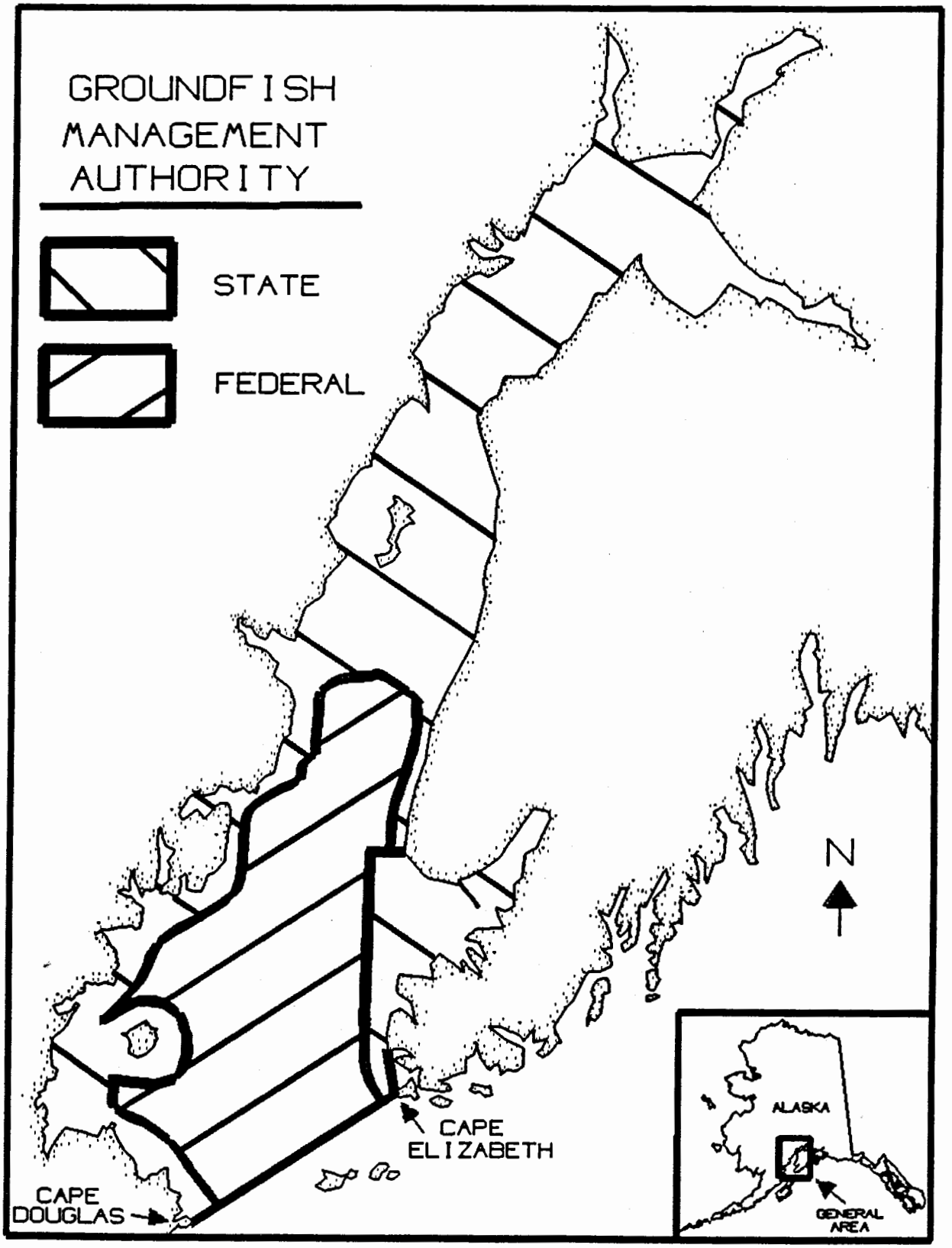

Figure 1. State and federal waters of Cook Inlet, Alaska.

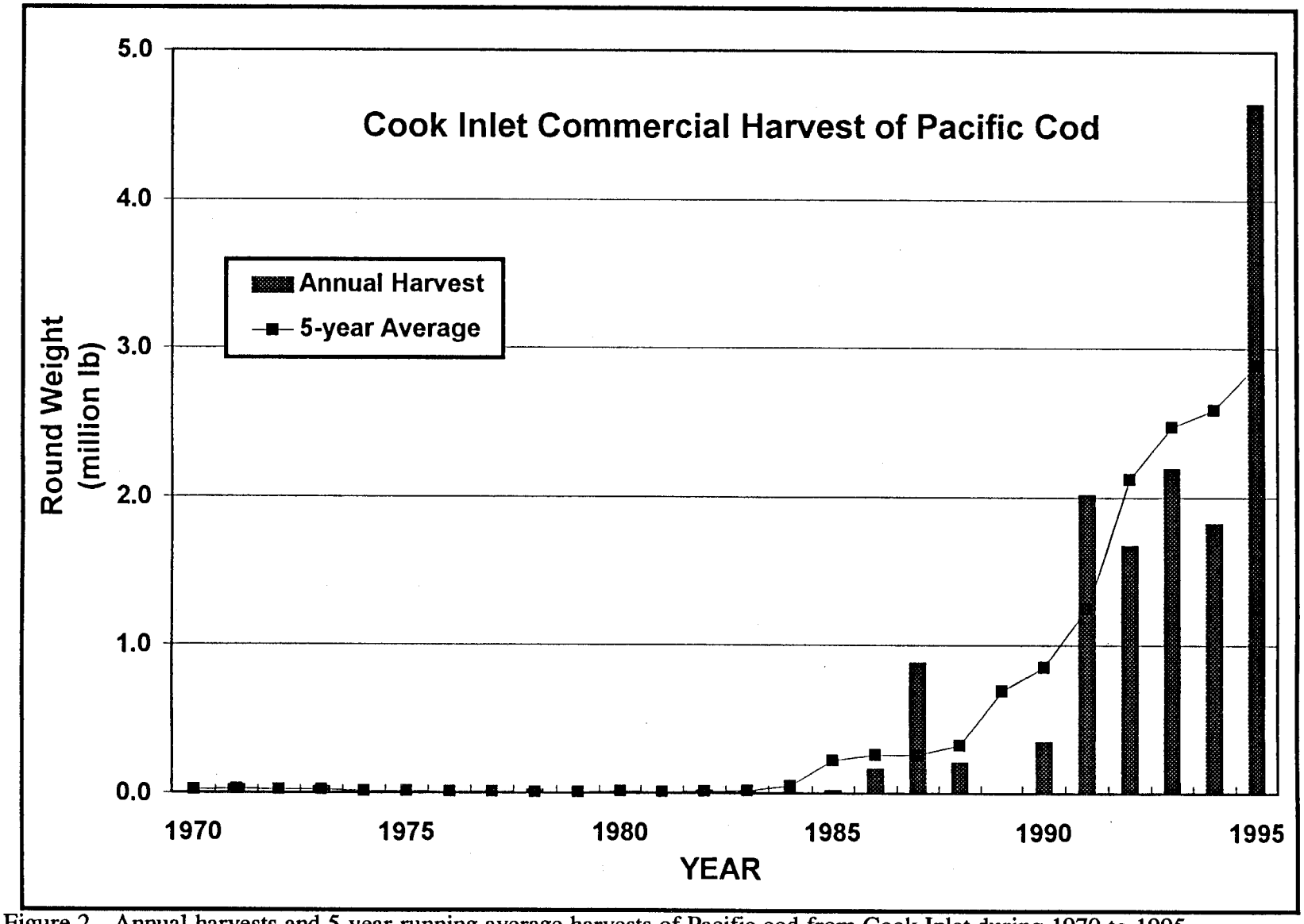

Figure 2. Annual harvests and 5-year running average harvests of Pacific cod from Cook Inlet during 1970 to 1995.

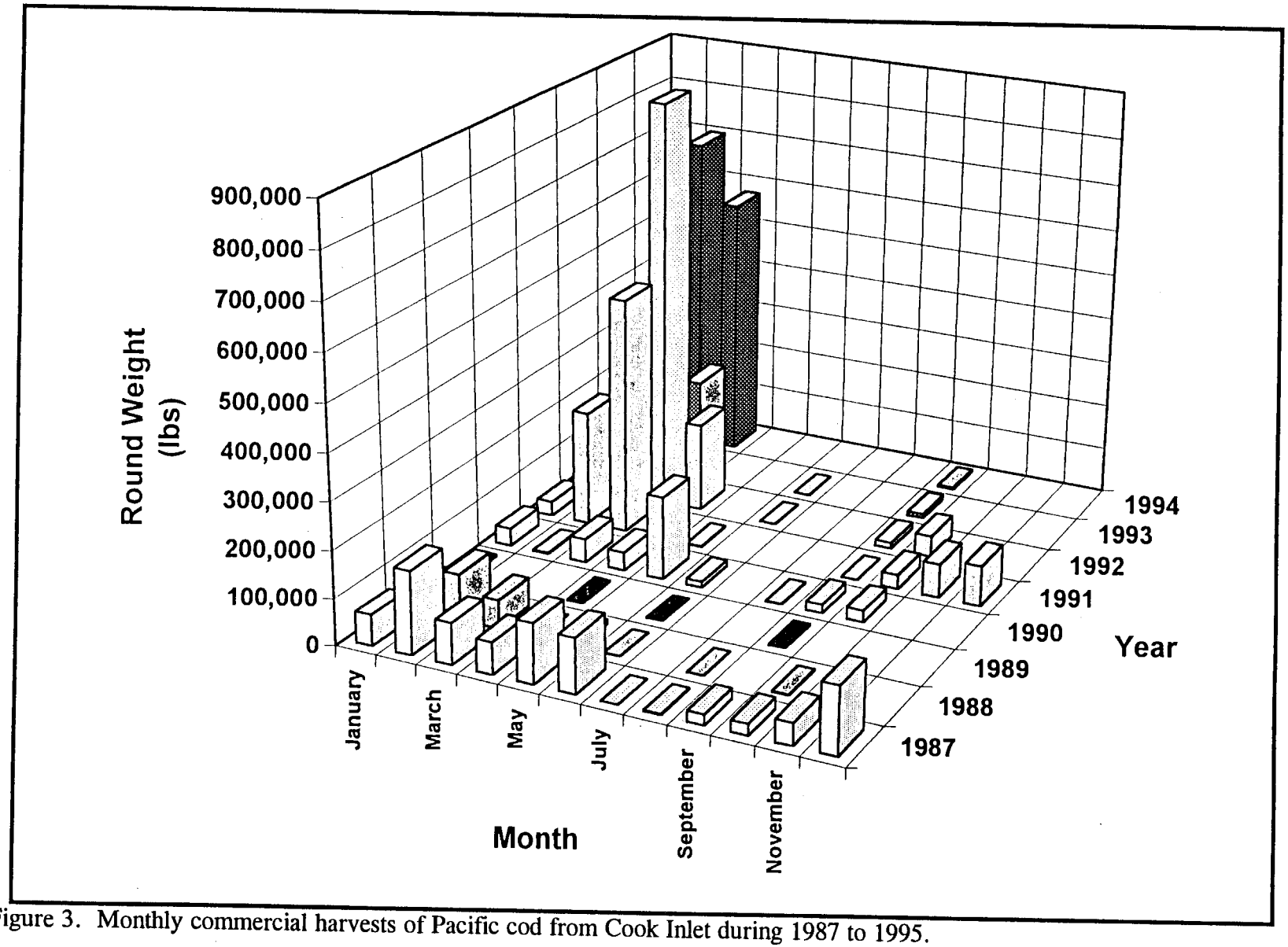

Figure 3. Monthly commercial harvests of Pacific cod from Cook Inlet during 1987 to 1995.

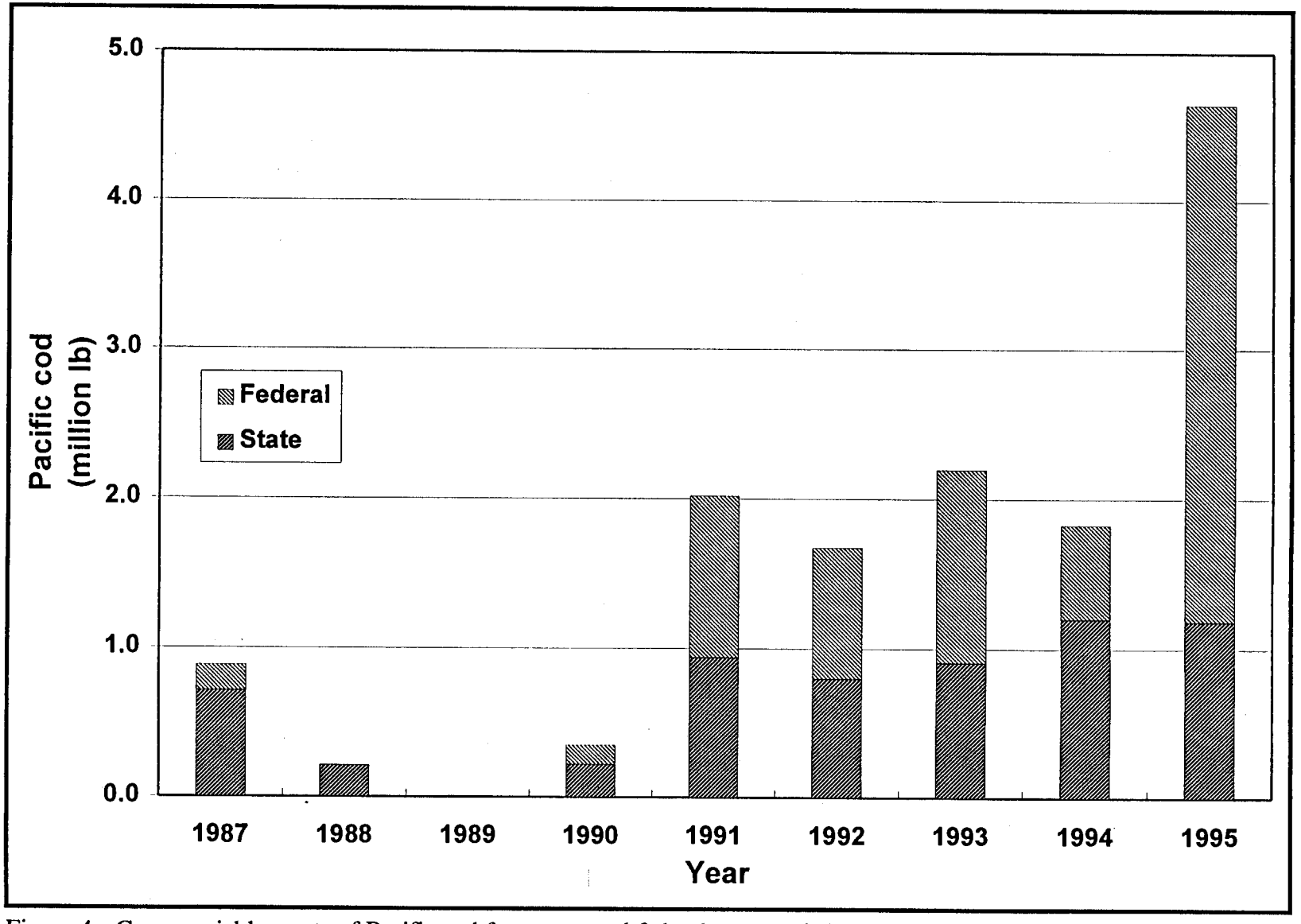

Figure 4. Commercial harvests of Pacific cod from state and federal waters of Cook Inlet during 1987 to 1995.

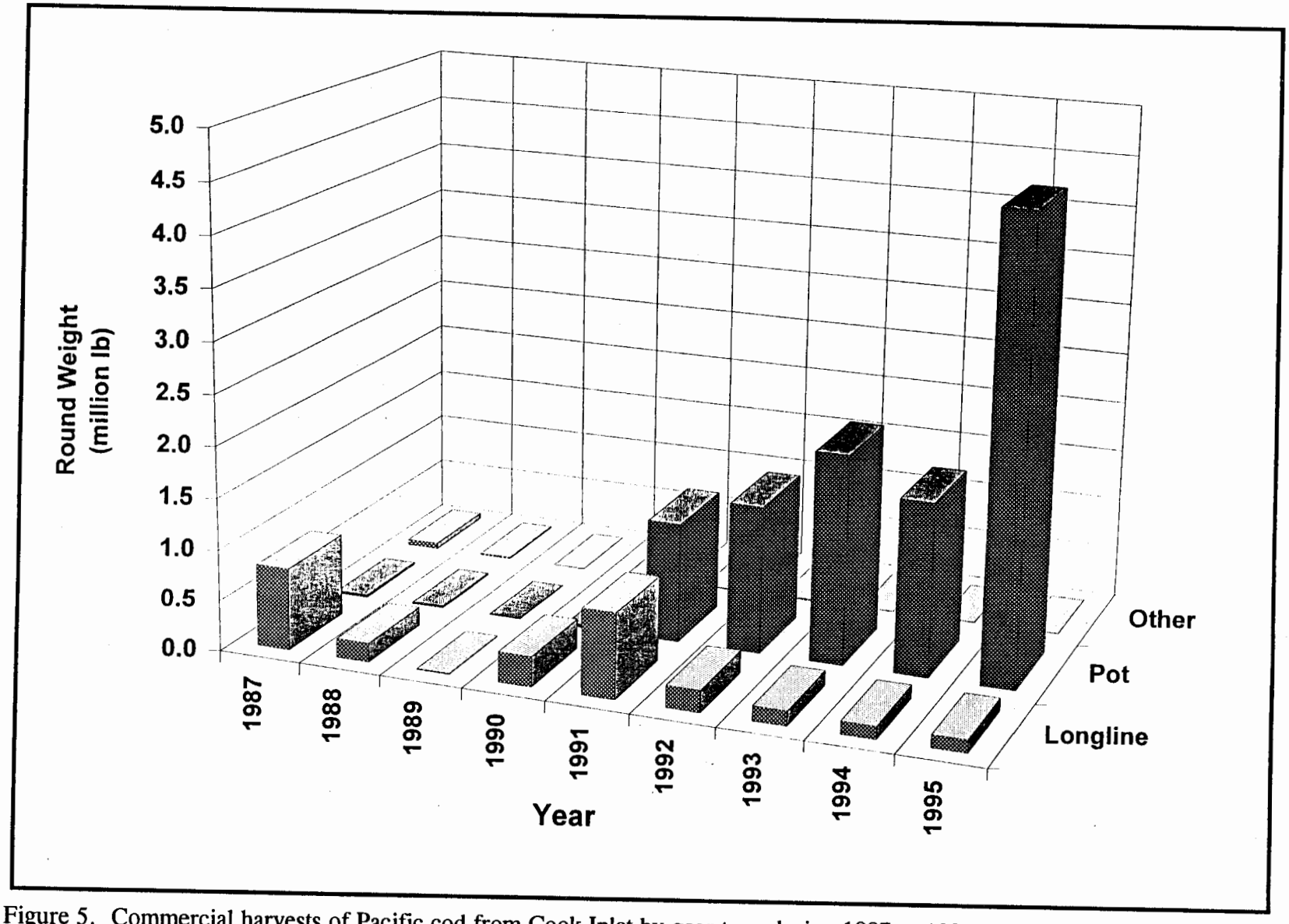

Figure 5. Commercial harvests of Pacific cod from Cook Inlet by gear type during 1987 to 1995.